

What is Claimed is:

1. An integral multi-stack system of fuel cell, comprising:

at least one pair of fuel cell stacks each having a stack unit combined by a predetermined number of single fuel cells, a first bus plate and a second bus plate respectively placed at a top side and a bottom side of the stack unit, and a plurality of ports on said first plate, including a fuel inlet, an oxidant inlet, a coolant inlet, a fuel outlet, an oxidant outlet, and a coolant outlet which are used for fuel supplying, oxidant supplying, coolant supplying, exhausted fuel discharging, exhausted oxidant discharging, and coolant discharging for said stack unit respectively;

a manifolding functional frame comprising a solid non-porous body having a plurality of main passages including a main fuel supply passage, a main oxidant supply passage, a main coolant supply passage, a main fuel discharging passage, and a main oxidant discharging passage, and a main coolant discharging passage provided therein without communicating with each other, said solid non-porous body further having more than one sets of sub-passages, wherein each of said sub-passages is provided for engaging with one said fuel cell stack and each of said sub-passages includes a fuel supply sub-passage, an oxidant supply sub-passage, a coolant supply sub-passage, a fuel discharging sub-passage, an oxidant discharging sub-passage, and a coolant discharging sub-passage which are communicating said main fuel supply passage, said main oxidant supply passage, said coolant supply passage, said main fuel discharging passage, said main oxidant discharging passage, and said coolant discharging passage, without communicating with one another, to said fuel inlet, said oxidant inlet, said coolant inlet, said fuel outlet, said oxidant outlet, and said coolant outlet of said fuel cell stack respectively; and

an attaching means for firmly attaching said fuel cell stack to said body of said manifolding functional frame, wherein when each said fuel cell stack is securely attached to said body of said manifolding functional frame, said fuel inlet, said oxidant inlet, said coolant inlet, said fuel outlet, said oxidant outlet, and said coolant outlet of said fuel cell stack are capable of air-communicating with said fuel supply sub-passage, said oxidant supply sub-passage, said coolant supply sub-passage, said fuel discharging sub-passage, said oxidant discharging sub-passage, and said coolant discharging sub-passage of said manifolding functional frame so as to make said main passages and said sub-passages to

be used to selectively supply and discharge gas or liquid used by said fuel cell stacks integrated.

2. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said attaching means comprises a pair of end plates being pulled towards each other by a plurality of long insulate bolts passing through a plurality of corresponding screw holes formed in said manifolding functional frame so as to sandwich said pair of fuel cell stacks therebetween.

3. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said attaching means comprises a tough box having screw holes therein, and wherein said fuel cell stack is fittedly putted into said tough box first and then said box is attached to said manifolding functional frame.

4. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said attaching means comprises a tough belt having screw holes therein and wrapping round said fuel cell stack, and wherein said belt is attached to said manifolding functional frame.

5. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said integral multi-stack system of fuel cell further has a sealing plate for fluid tightly connecting each said fuel cell stack to said manifolding functional frame.

6. The integral multi-stack system of fuel cell, as claimed in claim 5, wherein said sealing ring has a plurality of openings including a first fuel opening, a first oxidant opening, a first coolant opening, a second fuel opening, a second oxidant opening, and a second coolant opening which are able to align with said fuel inlet, said oxidant inlet, said coolant inlet, said fuel outlet, said oxidant outlet, and said coolant outlet of said first bus plate respectively when said fuel-stack is placed thereon, and a rubber sealing ring attached on each surface of the sealing plate surrounding each said opening thereof.

7. The integral multi-stack system of fuel cell, as claimed in claim 6, wherein said attaching means comprises a pair of end plates being pulled towards each other by a plurality of long insulate bolts passing through a plurality of corresponding screw holes defined in said manifolding functional frame so as to sandwich each said pair of fuel cell stacks therebetween.

8. The integral multi-stack system of fuel cell, as claimed in claim 6, wherein said attaching means comprises a tough box having screw holes therein, and wherein said fuel cell stack is fitly put into said tough box first and then said box is attached to said manifolding functional frame with screws.

5 9. The integral multi-stack system of fuel cell, as claimed in claim 6, wherein said attaching means comprises a tough belt having screw holes therein and wrapping round said fuel cell stack, and wherein said belt is attached to said manifolding functional frame with screws.

10 10. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said fuel is hydrogen and said oxidant is air or pure oxygen.

11. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein a passage fitting is provided for each said main passage to facilitate an access thereof to peripheral equipment.

15 12. The integral multi-stack system of fuel cell, as claimed in claim 6, wherein a passage fitting is provided for each said main passage to facilitate an access thereof to peripheral equipment.

13. The integral multi-stack system of fuel cell, as claimed in claim 10, wherein a passage fitting is provided for each said main passage to facilitate an access thereof to peripheral equipment.

20 14. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said main passages are not through passages through said body of said manifolding functional frame, and each of said main passages is able to reach and communicate with each sub-passage for which it supplies or discharges gas or liquid.

25 15. The integral multi-stack system of fuel cell, as claimed in claim 6, wherein said main passages are not through passages through said body of said manifolding functional frame, and each of said main passages is able to reach and communicate with each sub-passage for which it supplies or discharges gas or liquid.

16. The integral multi-stack system of fuel cell, as claimed in claim 13, wherein said main passages are not through passages through said body of said manifolding functional frame, and each of said main passages is able to reach and communicate with each sub-passage for which it supplies or discharges gas or liquid.

5 17. The integral multi-stack system of fuel cell, as claimed in claim 1, wherein said main passages are through passages through said body of said manifolding functional frame with one end thereof is detachably sealed.

18. The integral multi-stack system of fuel cell, as claimed in claim 6, wherein said main passages are through passages through said body of said manifolding
10 functional frame with one end thereof is detachably sealed.

19. The integral multi-stack system of fuel cell, as claimed in claim 13, wherein said main passages are through passages through said body of said manifolding functional frame with one end thereof is detachably sealed.